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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/725,444	12/03/2003	Toshiaki Asada	117966	5402

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EXAMINER	
ESHETE, ZELALEM	
ART UNIT	**PAPER NUMBER**
3748	

DATE MAILED: 05/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/725,444	ASADA ET AL.	
	Examiner	Art Unit	
	Zelalem Eshete	3748	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11 and 14-17* is/are rejected.

7)☒ Claim(s) *12 and 13* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *12/03/04;05/17/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-3,5,8,14-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Wright et al. (5,873,335).

Regarding claim 1: Wright discloses a valve driving system which is applied to an internal combustion engine having a plurality of cylinders for driving an intake or exhaust valve provided in each cylinder (see figure 5, column 1, lines 5 to 8), comprising: a plurality of cylinders for driving an intake or exhaust valve provided in each cylinder (see column 3, lines 1 to 5, 14 to 18), a plurality of valve-driving apparatuses, each of which is provided for at least each one of the intake valve and the exhaust valve (see column 4, lines 6 to 11), each valve driving apparatus comprising an electrical motor as a driving source for generating rotation motion and a power transmission mechanism provided with a transmitting section for transmitting the rotation motion generated by the electrical motor and a converting section for converting the rotation motion transmitted from the transmitting section into opening and closing motion of the valve to be driven (see figure 5); and a motor control device which

controls operations of electric motors of the respective valve-driving apparatuses in accordance with the operation state of the internal combustion (see abstract).

Regarding claims 2,17: Wright discloses claimed limitation as recited above; and Wright further discloses the motor control device controls the operation of the electric motor in accordance with the operation state of the internal combustion engine such as to change operation characteristics of at least one of an operation angle, lift characteristics and a maximum lift amount of the valve to be driven (see abstract).

Regarding claim 3: Wright discloses the converting section of the power transmission mechanism converts the rotation motion generated by the electric motor into the opening and closing motion utilizing a cam (see figures 5,6).

Regarding claim 5: Wright discloses the motor control device sets the control amount of the electric motor while taking, into account, a control state concerning intake or exhaust characteristics of the internal combustion engine (see column 4, lines 35 to 40).

Regarding claim 8: Wright discloses the motor control device estimates variation of the number of revolution of the internal combustion engine based on variation in the operation state of the internal combustion engine, and sets a control amount of the

electric motor while taking the result of the estimation into account (see column 4, lines 35 to 40).

Regarding claim 14: Wright discloses the motor control device includes a valve rotation executing device which drives the electric motor such that the valve rotates around an axial direction thereof in a predetermined time period during stoppage of the internal combustion engine (see figure 5).

Regarding claim 15: Wright discloses the motor control device includes a lift amount control device which normally and reversely drives the electric motor such that the lift amount of the valve is limited to a predetermined value which is smaller than a maximum lift amount which can be obtained when the cam is rotated through one revolution (see figures 1,5; abstract; column 4, lines 1 to 15).

Regarding claim 16: Wright discloses the motor control device includes a mode switching device which switches driving modes of the electric motor between a normal rotation mode in which the electric motor is driven only in the normal direction and a normal-reverse rotation mode in which the electric motor is normally or reversely rotated in accordance with the operation state of the internal combustion engine (see figures 1,5;column 4, lines 1 to 15; abstract).

3. Claims 1,2,17 are rejected under 35 U.S.C. 102(b) as being anticipated by Blish (5,016,583).

Regarding claim 1: Blish discloses a valve driving system which is applied to an internal combustion engine having a plurality of cylinders for driving an intake or exhaust valve provided in each cylinder (see figures 5,6), comprising: a plurality of cylinders for driving an intake or exhaust valve provided in each cylinder (see figure 5), a plurality of valve-driving apparatuses, each of which is provided for at least each one of the intake valve and the exhaust valve (see figure 5), each valve driving apparatus comprising an electrical motor as a driving source for generating rotation motion and a power transmission mechanism provided with a transmitting section for transmitting the rotation motion generated by the electrical motor and a converting section for converting the rotation motion transmitted from the transmitting section into opening and closing motion of the valve to be driven (see numeral 40); and a motor control device which controls operations of electric motors of the respective valve-driving apparatuses in accordance with the operation state of the internal combustion (see column 4, lines 1 to 5).

Regarding claims 2,17: Blish discloses claimed limitation as recited above; and Wright further discloses the motor control device controls the operation of the electric motor in accordance with the operation state of the internal combustion engine such as to change operation characteristics of at least one of an operation angle, lift

characteristics and a maximum lift amount of the valve to be driven (see column 4, lines 1 to 11).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wright in view of Shiraishi et al. (6,371,065).

Wright discloses the claimed invention as recited above; however, fails to disclose the motor control device sets a control amount of the electric motor while taking, into account, the variation of friction torque, which acts on rotation of the cam.

However, Shiraishi teaches engine control while taking into account the variation of friction torque, in that, Shiraishi teaches engine control system to compensate for friction loss and other mechanical losses (see column 5, lines 17 to 20).

It would be obvious to one having ordinary skill in the art at the time the invention was made to modify Wright's system by compensating for friction as taught by Shiraishi in order to account for frictional loss as taught by Shiraishi.

6. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wright in view of Miyashita et al. (5,220,904).

Wright discloses the claimed invention as recited above; however, fails to disclose the motor control device corrects the control amount of the motor such that an air fuel ratio is controlled to a predetermined target value while taking, into account, a control state concerning the air fuel ratio as internal combustion engine.

However, Miyashita teaches air fuel ratio is controlled to a predetermined target value while taking, into account, a control state concerning the air fuel ratio as internal combustion engine (see abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Wright's system by providing air fuel ratio control as taught by Miyashita in order to enhance the efficiency of the engine.

7. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wright in view of Hori et al. (6,401,684).

Wright discloses the claimed invention as recited above; however, fails to disclose an abnormality judging device which judges whether the valve driving system is abnormal based on a correction amount with respect to the control amount of the electric motor, the correction amount being provided by the consideration of the control state concerning intake or exhaust characteristics of the internal combustion engine.

However, Hori teaches an abnormality judging device which judges whether the valve driving system is abnormal, the correction amount being provided by the consideration of the control state concerning intake or exhaust characteristics of the internal combustion engine (see abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Wright's system by providing an abnormality judging system as taught by Hori in order to enhance the performance of the system. It also would have been obvious to judge the abnormality based on a correction amount with respect to the control amount of the electric motor in order to account for the electric motor performance.

8. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wright in view of Gu et al. (6,663,524).

Wright discloses the claimed invention as recited above; however, fails to disclose when a friction torque acting on the rotation of the cam assumes a negative value, the electric motor is capable of being driven by rotation motion of the cam to generate electricity.

However, Gu teaches an electric motor that is capable of being driven by the engine to generate electricity (see column 6, column 27 to 40).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Wright's system by providing an electric motor that can

be switched in its function as taught by Gu in order enhance the functionality of the electric motor as taught by Gu.

9. Claims 10,11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wright in view of Schroeder et al. (5,494,007).

Regarding claim 10: Wright discloses the claimed invention as recited above; however, fails to disclose a motor rotation position detecting device which detects a rotation position of the electric motor is added to the electric motor, and the motor control device includes a cam position specifying device which specifies a rotation position of the cam based on the detection result of the rotation position of the electric motor.

However, Schroeder teaches a motor rotation position detecting device, which detects a rotation position of the electric motor is added to the electric motor, and the motor control device includes a cam position specifying device which specifies a rotation position of the cam based on the detection result of the rotation position of the electric motor (see figure 13, numerals 10,108, column 8, lines 40 to 57).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Wright by providing a sensor as taught by Schroeder in order to implement the variable valve timing control system.

Regarding claim 11: With regard to the specified speed reduction ratio, it is the examiners position that the specified speed reduction ratio would have been an obvious matter of design choice well within the level of ordinary skill in the art depending on the dynamics specification of the valve control system. Moreover, there is nothing in the record which establishes that the claimed specified speed reduction ratio present a novel or unexpected result *(see In re Kuhle, 526 F.2d 553, 188 USPQ 7 (CCPA 1975))*.

Allowable Subject Matter

10. Claims 12,13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Blish (5,331,931) and Shimizu et al. (6,425,357) are related to the claimed invention in that a variable intake valve actuated by a motor is disclosed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zelalem Eshete whose telephone number is (571) 272-4860. The examiner can normally be reached on Monday to Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Denion can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Zelalem Eshete
Examiner
Art Unit 3748

THOMAS DENION
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